

Declassified IAW E.O. 12958 by the
Air Force Declassification Office and
Approved for Public Release.

Date: 8.17-06

K717.0413-89
Jan 1969
cy 1
48

PROJECT CHECO SOUTHEAST ASIA REPORT

20080725 203

GROUP-1

Excluded from automatic downgrading
and declassification.

DECLASSIFIED

K717.0413-48

c. 2

SHO-5-69(47 (C))

Declassified IAW E.O. 12958 by the
Air Force Declassification Office and
Approved for Public Release.

Date: 8-17-06

PROJECT
Contemporary
Historical
Evaluation of
Combat
Operations
REPORT

**OPERATION
THOR**

24 January 1969

HQ PACAF

**Directorate, Tactical Evaluation
CHECO Division**

Prepared by: Melvin F. Porter
Major A. W. Thompson
Project CHECO 7th AF, DOAC

DOTEC-69-6

UNCLASSIFIED

PROJECT CHECO REPORTS

The counterinsurgency and unconventional warfare environment of Southeast Asia has resulted in the employment of USAF airpower to meet a multitude of requirements. The varied applications of airpower have involved the full spectrum of USAF aerospace vehicles, support equipment, and manpower. As a result, there has been an accumulation of operational data and experiences that, as a priority, must be collected, documented, and analyzed as to current and future impact upon USAF policies, concepts, and doctrine.

Fortunately, the value of collecting and documenting our SEA experiences was recognized at an early date. In 1962, Hq USAF directed CINCPACAF to establish an activity that would be primarily responsive to Air Staff requirements and direction, and would provide timely and analytical studies of USAF combat operations in SEA.

Project CHECO, an acronym for Contemporary Historical Evaluation of Combat Operations, was established to meet this Air Staff requirement. Managed by Hq PACAF, with elements at Hq 7AF and 7/13AF, Project CHECO provides a scholarly, "on-going" historical evaluation and documentation of USAF policies, concepts, and doctrine in Southeast Asia combat operations. This CHECO report is part of the overall documentation and evaluation which is being accomplished. Along with the other CHECO publications, this is an authentic source for an assessment of the effectiveness of USAF airpower in SEA.



MILTON B. ADAMS, Major General, USAF
Chief of Staff

UNCLASSIFIED

[REDACTED]

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS PACIFIC AIR FORCES
APO SAN FRANCISCO 96553



REPLY TO
ATTN OF: DOTEC

24 January 1969

SUBJECT: Project CHECO Report, "Operation THOR", (U)

TO: SEE DISTRIBUTION PAGE

1. Attached is a SECRET document. It shall be transported, stored, safeguarded, and accounted for in accordance with applicable security directives. Each page is marked according to its contents. Retain or destroy in accordance with AFR 205-1. Do not return.

2. This letter does not contain classified information and may be declassified if attachment is removed from it.

FOR THE COMMANDER IN CHIEF

A handwritten signature in cursive script, appearing to read "Warren H. Peterson", is written over the typed name.

WARREN H. PETERSON, Colonel, USAF
Chief, CHECO Division
Directorate, Tactical Evaluation
DCS/Operations

1 Atch
Proj CHECO Rpt (S),
24 Jan 69

UNCLASSIFIED

DISTRIBUTION

HQ USAF

AFAAC	1 Cy
AFAMA	1 Cy
AFBSA	1 Cy
AFCCS-SA	1 Cy
AFCHO	2 Cys
AFGOA	2 Cys
AFIIN	1 Cy
AFISI	3 Cys
AFISL	1 Cy
AFMSG	1 Cy
AFNINA	1 Cy
AFNINCC	1 Cy
AFNINDE	3 Cys
AFOAPS	1 Cy
AFOCC	1 Cy
AFOCE	1 Cy
AFOMO	1 Cy
AFOWX	1 Cy
AFDPD	1 Cy
AFPMRE	1 Cy
AFRDC	1 Cy
AFRDR	1 Cy
AFRDQ	1 Cy
AFSLP	1 Cy
AFSMS	1 Cy
AFSME	1 Cy
AFSSS	1 Cy
AFSTP	1 Cy
AFXOP	1 Cy
AFXOSS	1 Cy
AFXOSL	1 Cy
AFXOSO	1 Cy
AFXOSN	1 Cy
AFXOPR	1 Cy
AFXOTZ	1 Cy
AFXPD	9 Cys
AFXDOC	1 Cy
AFXDOD	1 Cy
AFXDOL	1 Cy

SAFOI	2 Cys
SAFLL	1 Cy
SAFAA	1 Cy

MAJCOM

AU (ASI-HA)	2 Cys
AU (ASI-ASAD)	1 Cy
AU (AUL3T-66-7)	1 Cy
AU (ACSC)	1 Cy
ADC (ADODC)	1 Cy
ADC (ADOOP)	2 Cys
ADC (ADLPP)	2 Cys
TAC (DO-0)	1 Cy
TAC (DPL)	2 Cys
TAC (DOTS)	1 Cy
TAC (DORQ)	1 Cy
TAC (DI)	1 Cy
MAC (MAFOI)	1 Cy
MAC (MAOID)	1 Cy
MAC (MAOCO)	1 Cy
AFSC (SCL)	8 Cys
AFSC (SCO)	2 Cys
AFLC (MCO)	1 Cy
AFLC (MCF)	1 Cy
ATC (ATXDC)	1 Cy
SAC (DO)	1 Cy
SAC (DPL)	1 Cy
SAC (DXI)	1 Cy
SAC (DIX)	1 Cy
SAC (OA)	1 Cy
USAF A (DFH)	1 Cy
USAF E (OPL)	2 Cys
USAF SO (BIOH)	1 Cy
USAF SS (ODC)	1 Cy
USAF SS (COI-5)	1 Cy

OTHERS

9AF (DO)	1 Cy
12AF (DI)	1 Cy

19AF (DO)	1 Cy
USAFAGOS	1 Cy
USAFSOS (DO)	1 Cy
USAF TAWC (DA)	1 Cy
USAF TARC (DI)	1 Cy
USAF TALC (DA)	1 Cy
USAF TFWC (CRCD)	1 Cy
FTD (TDPI)	1 Cy
AFAITC	1 Cy
SRAFREP (SWC)	1 Cy
USCINCEUR (ECJCO)	1 Cy

PACAF

DP	1 Cy
DI	1 Cy
DO	1 Cy
DPL	1 Cy
DXIH	1 Cy
5AF (DOP)	1 Cy
7AF (DOAC)	9 Cys
13AF (DOP)	1 Cy
13AF (DXI)	1 Cy
834AIRDIV	1 Cy
3TFW	1 Cy
8TFW	1 Cy
12TFW	1 Cy
14SOW	1 Cy
31TFW	1 Cy
35TFW	1 Cy
37TFW	1 Cy
56SOW	1 Cy
315SOW	1 Cy
355TFW	1 Cy
366TFW	1 Cy
388TFW	1 Cy
432TRW	1 Cy
460TRW (DCO)	1 Cy
483TAW	1 Cy
553RECON WG	1 Cy
6400 TEST SQ	1 Cy
DOTEC	6 Cys

UNCLASSIFIED

TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	vi
CHAPTER I. THE SITUATION	1
CHAPTER II . THE PLAN	4
CHAPTER III. EXECUTION OF OPERATION THOR	12
Phase 1	12
Phase 2	12
Phase 3	13
CHAPTER IV. RESOURCES EXPENDED AND RESULTS	15
Results of Operation THOR	17
CHAPTER V. SUMMARY OF OPERATION	21
Lessons Learned	21
FOOTNOTES	
Chapter I	24
Chapter II	24
Chapter III	26
Chapter IV	26
Chapter V	27
APPENDIX I - THOR, Ammo Expenditures, BDA/Gun Damage Assessment	29
GLOSSARY	32
FIGURES	
1. Tube Artillery and NGF Support	4
2. ARC LIGHT Targeting for THOR	14
3. Operation THOR Statistics	20



FOREWORD

Operation THOR was a seven-day SLAM operation which took place in a portion of the Demilitarized Zone and lower Route Package I from 1 through 7 July 1968. It demonstrated the awesome amount of ordnance (a "ton a minute") that could be delivered by a joint-service exercise into a small geographic area over a short-time span. Coordination and communications in Operation THOR were benefited from lessons learned in previous SLAM operations (Operations NEUTRALIZE and HEADSHED), and from preplanning conferences; however, post-operation critiques revealed there were strides to be made in these areas, at least insofar as multi-service exercises were concerned.

The air effort in THOR was labeled an unqualified success by U.S. Marine commanders in northern I Corps Tactical Zone, largely upon the basis of "inferred BDA" and the reduction in enemy artillery, antiaircraft artillery (AAA), and shore battery fires.

Air Force planners, however, were concerned about the possibility that an inordinate amount of sorties may have been employed to achieve unknown effects. Several reviews of Operation THOR photography failed to substantiate the BDA claimed by III MAF; the question arose as to whether the effort was really worthwhile, and whether the sorties could have been used to better effect elsewhere.

[REDACTED]

CHAPTER I
THE SITUATION

The U.S. 3d Marine Division Area of Operation (AO), located in northern Quang Tri Province of the Republic of Vietnam (RVN), was bordered on the north by the southern boundary of the Demilitarized Zone (DMZ). Immediately north of the 3d Marine Division AO, through the DMZ and north to YD 90 (UTM Coordinates) an area known as the Cap Mui Lay Sector exerted a major influence upon friendly operations in South Vietnam. A heavy concentration of North Vietnamese Army artillery facing the 3d Marines, as well as the U.S. 9th Marines and the ARVN 1st and 2d Divisions, was located in the Cap Mui Lay Sector (CMLS). Also in this area were large numbers of antiaircraft installations, which had succeeded in denying the area to effective aerial observation, and had limited the accuracy of air support. This high-threat counter-surveillance screen of AA installations, coupled with the enemy's expert use of camouflage and constant, covert movement of his artillery, had to a great extent limited friendly knowledge of enemy artillery deployment in the CMLS.^{1/}

In addition, a sub-sector, the Cap Mui Lay Coastal Sector (CMLCS), contained heavy shore batteries which had forced Naval Gunfire (NGF) ships well off shore, resulting in a substantial reduction in effective NGF range in the northern sections of the 3d Marine AO and in the eastern portion of the CMLS.^{2/} Navy destroyers such as the O'Brien and Benner, with a maximum effective range of 13.7 kilometers were placed under restrictive handicaps by being forced to operate 10 to 16 kilometers off the North Vietnamese coast. Even destroyers such as the Turner Joy and Cochrane, with 5"/54 guns and a maximum effective

[REDACTED]

range of 18,000 yards could be pushed out to the limits of their accuracy by the heavier shore batteries.^{3/}

Because of immunity from ground attack, which the enemy enjoyed north of the Demarcation Line, he was able to displace his heavy artillery well forward, which enabled him to bring fire to bear south of the Cua Viet River, and in turn allowed him to interdict this important port and supply line. As the primary port for the area, Cua Viet had to meet the logistics demands for the 1st Air Cavalry, as well as the Marine units to the north and east. During the NE monsoon, seasonal silting of the Cua Viet Harbor restricted landing ships such as LSTs from marrying at the ramp, and forced extensive use of lighterage to get supplies into the port. This cumbersome transfer and shuttle operation made the line of communication (LOC) even more vulnerable; intense enemy interdiction of the Cua Viet complex during the flooding season could have a serious effect on the northern Quang Tri logistics posture.^{4/}

Finally, this same forward positioning of his heavy artillery (since it was in sanctuary and safe from ground attack) gave the enemy a distinct advantage over friendly artillery, which had been forced back and away from the DMZ.^{5/}

A number of factors accrued to the enemy's advantage. As secure as his position was, the enemy communicated almost solely by land lines, and by not using radios denied friendly intelligence the ability to fix his positions or compromise his plans. With highly mobile artillery and a multitude of well-concealed positions, the North Vietnamese Army (NVA) could and did have their tubes on short notice. Even firm intelligence that a gun position was occupied

SECRET

was subject to decay overnight; by morning the artillery could be set up and ready to fire from a different location. By contrast, Marine positions south of DMZ were relatively fixed. The NVA artillery fired primarily in the daytime to reduce visual acquisition of his guns by muzzle blast. These tactics, coupled with a bristling AA fire, which denied visual observation by low, slow flying FACs, drastically reduced friendly knowledge of enemy intentions in the Cap Mui Lay Sector.^{6/} It was accepted that the threat did exist, however, and from photo interpretation, Side Looking Airborne Radar (SLAR) and from visual reconnaissance by Misty F-100F FACs, an estimate was drawn of approximately 450 artillery positions (largely unoccupied but available for use) within the roughly ten by fifteen-mile area.^{7/}

An intensive low-level photo reconnaissance program was conducted by Seventh Air Force prior to implementation of the strike of THOR. Forty-two missions were flown at 500 to 1,000 feet, revealing these positions and providing, in large part, the AF target base. Marine reconnaissance missions were also flown at medium altitude, but these did not provide a photo scale large enough to assess results.^{8/}

SECRET



CHAPTER II

THE PLAN

Lt. Gen. R. E. Cushman, Commanding General, III Marine Expeditionary Force, (CG, III MAF), was concerned with the threat implicit in the CMLS artillery buildup, and expressed this feeling in a message to COMUSMACV in late May.^{1/} On 11 June, the CG, III MAF, reiterated his concern and advanced a plan to counter the enemy advantage. In part, the message said:^{2/}

"My 200028Z May 68 outlined the continuing threat of the enemy artillery stronghold in Cap Mui Lay Sector (CMLS). Efforts to reduce this threat have thus far been ineffective, and it is my conviction that a major operation is required in order to do the job and do it right. Past efforts have been limited in scope, have been hastily planned and executed, and have been inadequate to reduce the threat on a sustained basis. I am therefore proposing an operation to reduce effectively the present threat and to keep it neutralized in followon operations."

After defining the geographical limitations of the Cap Mui Lay Sector and Cap Mui Lay Coastal Sector (Fig. 1), CG, III MAF, went on to propose:^{3/}

"I would like to conduct an attack on CMLS installations with a carefully phased and integrated application of massed air, artillery and Naval Gunfire. My general concept is as follows:

"Phase I: D-Day and D plus 1, massive bombardment of known enemy AAA, ARTY, and shore batteries within CMLS with the objectives of crippling his immediate capability to respond and to uncover additional target locations by FAC and poststrike photo recon.

"This phase would employ all available ARC LIGHT support you could provide on most profitable target areas, with Tac Air hitting dispersed target sites as established by hard intelligence.

"Assume 7th Air Force would control this phase on targets selected by III MAF/7th AF jointly.

THOR

TUBE ARTILLERY & NFG SUPPORT

CAP MUI LAY SECTOR

CAP MUI LAY COASTAL SECTOR

A 4
CON THIEN
•
155 H
•
155 H
•
8" H

A 3
•
155 H
•
155 H

A 2
GIO LINH
•
155 H
•
8" H
•
8" H

C 1
•
175 G

C 3
•
175 G
•
CAM LO

DONG HA
•
175 G
•
175 G
•
175 G

FIGURE 1

[REDACTED]

"ARTY and supporting infantry occupy forward positions south of DMZ night of D plus 1. I am thinking of up to 14 Btrys of heavy ARTY plus 2 to 3 Inf Bns to protect them.

"Phase II: D plus 2 and D plus 3, an integrated attack concentrated in the CMLCS to secure a permissive environment for AO/FAC aircraft and close-in NGF support.

"This phase would deliver a heavy volume of Tac Air/ARTY/NGF supporting fires to effectively destroy hostile batteries in the coastal sector.

"III MAF would control this integrated attack utilizing the control facilities of the Dong Ha FSCC/DASC supported by DASC Victor if required.

"7th AF support could be employed in this phase to interdict and isolate CMLS by attacking choke points west and north of the coastal sector.

"Phase III: D plus 4 to D plus 6, integrated attacks continue at reduced volumes of fire to open all CMLS from N to S and E to W to close surveillance by AO/FAC and precision destruction of enemy ARTY and installation by observed fires.

"III MAF controls as in Phase II.

"Friendly artillery and supporting infantry withdraw from advanced positions evening D plus 6."

Phase IV was envisioned as a continuing program of observation and photo reconnaissance with immediate attacks on reemergent AAA, artillery, and shore battery installations. The CG, III MAF, believed that in addition to a maximum of 14 heavy and medium artillery batteries in forward positions, the operation would require two cruisers and six destroyers for Naval Gunfire support. At the time of his message, requirements for Air, FAC, and Seventh Fleet Air support were still under study.^{4/}

In his proposal, CG, III MAF, made a strong plea that, after the

~~SECRET~~

massive air bombardment in Phase I under control of 7AF, he be given Fire Support Coordination and Control (FSCC) responsibility for the remainder of the operation. His rationale was: "...the stronghold directly threatens III MAF forces, bases and lines of communication in northern I CTZ", and "...the complexity of integrating the supporting fires of all arms in the engagement of targets of opportunity during Phases II and III requires the staff facilities of the Dong Ha FSCC/DASC which are organic to III MAF." As a final point he stated, "III MAF has a continuing interest in the CMLS and should have primary responsibility for keeping it neutralized in Phase IV."^{5/}

In essence the request, if concurred with, would give CG, III MAF, Fire Support Coordination and Control over all Air Force, Navy, and Marine fires in a 7AF Area of Operation for an indefinite period of time, since Phase IV stipulated no cutoff date. Commander, 7AF concurred in principle with the need for a combined operation to neutralize the enemy artillery and other installations in the Cap Mui Lay Sector, but did not concur with the proposed deviation from the established control procedures for the area.^{6/} The procedures were specifically delineated in Military Assistance Command, Vietnam (MACV) Directive 95-1 and stipulated that "FSCC in the TALLY HO area north of the DMZ (and including the CMLS and CMLCS) is accomplished by 7th Air Force." This directive, dated 21 January 1968, was actually instituted to facilitate air, artillery, and naval fires in the lower TALLY HO area in such a way as to minimize interference and insure maximum effective fires on target, and constituted a formal agreement between Seventh Air Force and III MAF.^{7/}

III MAF's contention that they should control fires in the CMLS portion

[REDACTED]

of TALLY HO was based upon the enemy threat being contiguous to their AO. In point of fact, III MAF had no friendly forces actually in the TALLY HO area, while 7AF had Misty FACs, reconnaissance and strike aircraft within the air-space over it on a daily basis, and could not rationally be expected to relinquish fire control indefinitely to an agency which did not. In concurring with the need for the combined operation, Seventh Air Force recommended that a planning meeting be held with the principals involved as soon as possible, to work out detailed plans and requirements for the operation.^{8/}

The initial planning meeting for the operation was held at Provisional Corps V (PCV) at Phu Bai on 21 June. This conference provided a preliminary summary of requirements for THOR, which was submitted to III MAF by PCV as the planning agent in northern I CTZ. The estimated required naval gunfire included two heavy cruisers with 2,000 rounds of 8"/55 ammunition and 3,500 rounds of 5"/38 per ship. In addition, six destroyers with a total of 7,000 rounds of 5" shells were requested; a maximum number of destroyers with 5"/54 guns were desired because of the probable standoff distance necessary during early operations.^{9/}

The preliminary estimate for B-52 and Tac Air commitments envisioned 60 ARC LIGHT and 300 Tac Air sorties per day for D-Day and D+1 (the massive air bombardment phase), followed by 24 ARC LIGHT and 150 Tac Air sorties for D+2 and D+3 in Phase II. For Phase III, D+4, 5, and 6, the B-52s were to fly 18 sorties per day, while Tac Air contributed 120. The total commitment for field artillery was not yet formulated.^{10/}

[REDACTED]

COMUSMACV published the initiating directive for Operation THOR on 25 June. Basically, the directive was as proposed by CG, III MAF; Commander, 7AF, would control Phase I. CG, III MAF, with CG, PCV, as agent, would control Phases II and III. However, following Phase III, control would revert to normal procedures in the TALLY HO and DMZ areas. ^{11/}

The Phu Bai meeting was followed by a conference chaired by Seventh Air Force at Udorn RTAFB, Thailand, on 27 June. At this conference, the air commitment to THOR was expanded and matters of final coordination between the services were addressed. USAF tactical and strategic strike resources for THOR were obtained from the following organizations: ^{12/}

<u>Unit</u>	<u>Location</u>
3d Air Division	Andersen AFB, Guam
8th TFW	Ubon RTAFB, Thailand
12th TFW	Cam Ranh Bay AB, RVN
355th TFW	Takhli RTAFB, Thailand
366th TFW	Da Nang AB, RVN
388th TFW	Korat RTAFB, Thailand
432d TRW	Udorn RTAFB, Thailand

Supporting forces were F-100F FAC aircraft from the 37th Wing, Phu Cat AB, RVN and general FAC support from the 20th Tactical Air Support Squadron (TASS), Da Nang AB, RVN.

The final phasing for the operation appeared this way: ^{13/}

[REDACTED]

Phase I	D, D+1
	60/54 B-52 sorties 300 Tac Air sorties
Phase II	D+2, D+3
	30/24 B-52 sorties 225 Tac Air sorties Naval Gunfire Marine Artillery
Phase III	D+4, D+5, D+6
	18 B-52 sorties 180 Tac Air sorties Naval Gunfire Marine Artillery
	D+7 (Termination) Air and ARTY as required.

In matters of command and control, the conference adhered to the initiating directive; during Phase I, 7AF would maintain normal control from the DMZ north. At the beginning of Phase II, the bomb line would move to include the THOR AO and give PCV control of all targeting. The Airborne Command and Control Center (ABCCC) would continue to coordinate airstrikes, however, and the PCV Army artillery representative agreed that artillery would shut down on ABCCC requests unless engaged in counter-battery fire. ^{14/} Among other matters discussed during the conference were: ^{15/}

- Three separate holding points 25 nautical miles from Dong Ha TACAN were established to facilitate air marshaling to ingress the AO. ABCCC Operations stressed that strike aircraft must meet times at holding points by plus or minus one minute, and that early or late arrivals would complicate traffic flow.
- A suggestion to simplify fighter check-in procedures by eliminating initial calls to ABCCC was rejected. The

[REDACTED]

suggested change would not only have weakened positive command control but would have introduced a sudden procedural change just before a major operation.

- MSQ and ASRT (Air Surveillance Radar Teams, Marine TPQ) representatives were concerned with converging path of flights from holding points to targets. Reemphasis upon meeting times at the holding points assuaged this apprehension.
- Preplanned egress heading from target area was discussed; no hard and fast rule was deemed appropriate since MSQ/ASRT instructions would suffice, and active artillery sectors could negate any published heading.
- To facilitate artillery coordination in Phases II and III, a division of the AO into sectors for diverting artillery strikes was considered appropriate.

Although, at this conference, a complete and integrated fire plan for D+2 and the following days was still not promulgated, preparations for the operation continued. Airstrikes against SAM and artillery sites were being directed to prep the area, preplanned photo recon flights were covering the Cap Mui Lay Sector to develop up-to-date targets, and a special 7AF DI targeting team had worked up a target list that promised lucrative results during Phase I. This targeting team, working physically in the 12th Reconnaissance Intelligence Technical Squadron, had developed some 270 targets consisting of AA, field artillery, SAMs, truck parks, and supply areas in the DMZ and CMLS within the 30 days prior to Operation THOR.^{16/} These targets made up the ARC LIGHT boxes for D and D+1.

To insure that THOR operational schedules were met, several preparatory actions were taken by the ground forces. Construction of forward artillery positions began a week before the operation, and movement of required heavy

[REDACTED]

tonnages of artillery ammunition began on 27 June. Communications for the PCV Command Post were installed by 28 June; also, displacement of heavy artillery units from the southern portion of the PCV AO started on D+1. All artillery batteries were in position as scheduled by the evening of D+1, as were the naval gunfire ships. ^{17/}

With most preliminary coordination accomplished at the two meetings, the stage was set to put the plan into operation. On 30 June, COMUSMACV issued Execute Orders for Operation THOR, and on 1 July, the bombardment phase began. ^{18/}

[REDACTED]

CHAPTER III
EXECUTION OF OPERATION THOR

Phase I

Massive bombardment, under the control of 7AF, took place on D and D+1 to obtain maximum destruction and to permit the forward positioning of artillery and naval gunfire ships. B-52 and Tac Air struck in the CMLS from the coast to YD 0883. Targets were selected jointly by 7AF and PCV. Artillery occupied forward positions at A-2, A-3, A-4, C-1, and Dong Ha.^{1/} (Fig. 1.) Marine and Army artillery fire basically paralleled the DMZ, while naval gunfire concentrated from east of Route 1A to the beach.^{2/}

After Phase I, the Navy ships came to within ten km of the coast and received no fire from the coastal guns. Friendly artillery south of the DMZ moved forward to previously untenable positions and took no incoming artillery rounds until D+6, when they received a total of ten rounds. This contrasted with earlier periods when sites such as Con Thien were pounded by hundreds of incoming rounds every day.^{3/}

Phase II

On D+2 and D+3, air, artillery, and NGF attacked antiaircraft and artillery installations in the CMLCS nominated to 7AF by PCV, to create a permissive environment for aerial observation and coastal bombardment.^{4/} Army O-1s provided aerial reconnaissance and target acquisition capability to the ground commander with apparently minimal risk as very little groundfire was encountered with no known battle damage.^{5/}

[REDACTED]

The CG, PCV, requested that 7AF provide three FAC aircraft to support NGF during daylight hours on D+2 through D+6. 7AF provided two O-2 FAC aircraft with the stipulation that they would not operate over land in the THOR AO.^{6/} However, Misty FACs (F-100F) ranged over the entire AO, and in addition to directing airstrikes, assisted in target acquisition.

Phase III

Phase III, D+4, D+5, and D+6, was conducted under the same targeting procedures as Phase II. The general objective was to open the entire sector to close aerial observation and precision destruction. The specific goal was to destroy enemy AA, SAM, and artillery weapons by observed precision fires.^{7/}

During Phase III, Army observer aircraft were able to operate deep within the operational area with no losses, and naval gunfire ships closed within five km of the shore without being fired on. The observer aircraft further extended their area of operation west of Route 1A and north of the DMZ to the 85 grid line. There were no hits or casualties recorded. In fact, despite the high number of Tac Air sorties flown during the operation, only two aircraft losses to enemy ground fire were reported.^{8/}

The increase of strike aircraft in a relatively compressed airspace necessitated control measures for maximum firepower with minimum interference. Measures adopted were:^{9/}

- ° Establishing and assigning Fire Control Zones (FCS) to various attack agencies during the day to include aircraft entry and exit corridors. Coordination techniques insured vertical/horizontal separation of weapons

SECRET

trajectories and aircraft flight paths. Zones were frequently used by all fires simultaneously. Maximum ordinates of artillery were passed to ABCCC, who then insured that airstrikes were conducted with minimum mutual interference.

- Designating minimum drop altitudes for TPQs and maximum ordinates for artillery. A minimum drop altitude of 22,000 feet for radar directed airstrikes was prescribed. Artillery and NGF were limited to maximum ordinates of 20,000 feet, thus providing a 2,000-foot buffer zone.

SECRET

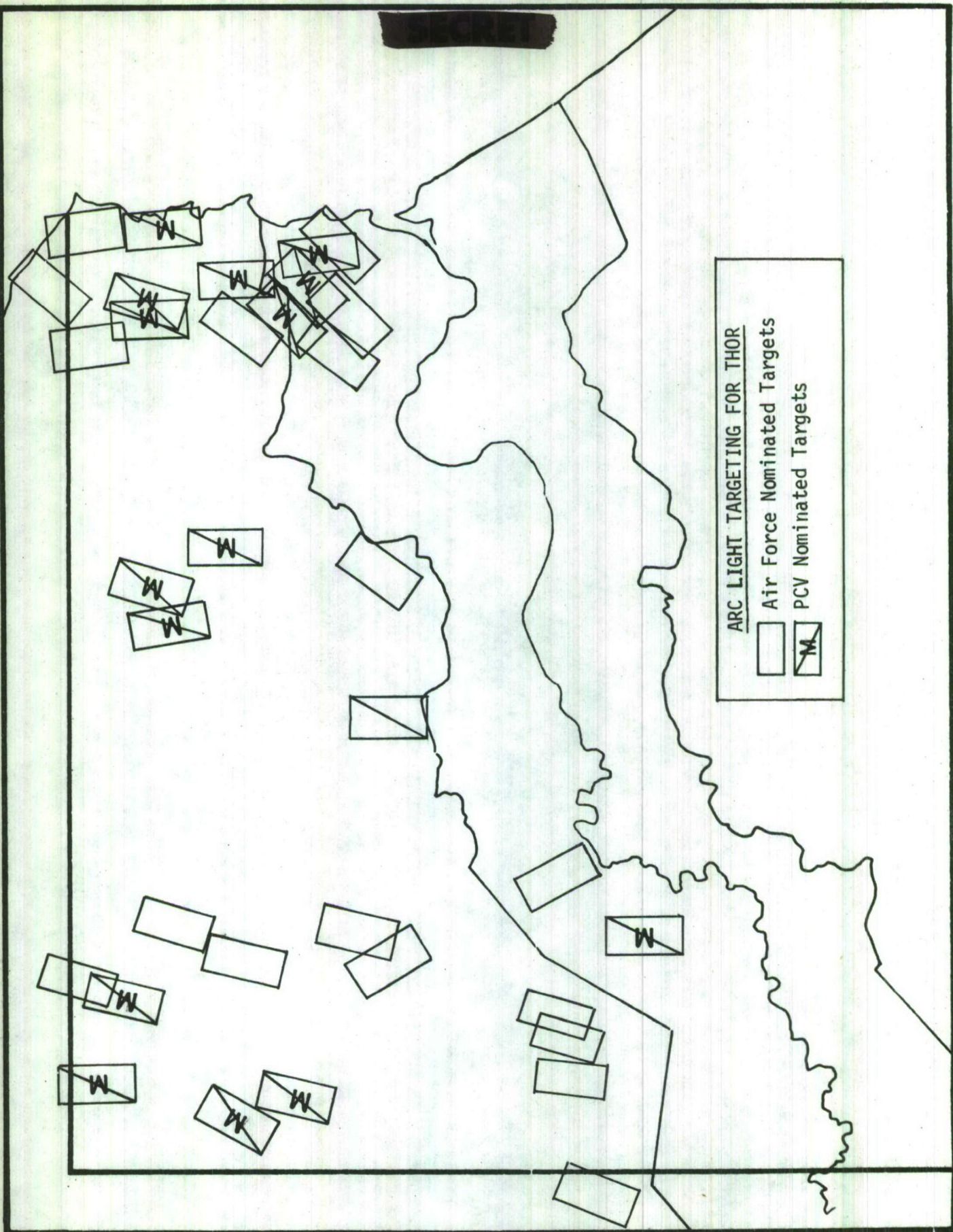


FIGURE 2

SECRET

CHAPTER IV
RESOURCES EXPENDED AND RESULTS

Seventh Air Force out-country resources were heavily committed to Operation THOR. For example, approximately 79 percent of the total Air Force effort was provided by Thai-based aircraft.^{1/} The combined sortie breakout from 30 June at 1601Z to 7 July at 1600Z was:^{2/}

<u>SERVICE</u>	<u>STRIKE</u>	<u>FAC</u>	<u>PHOTO</u>	<u>ECM</u>	<u>PSYWAR</u>	<u>TOTAL</u>
7AF	651	70	27	142	6	896
SAC	210					210
USN	500					500
USMC	<u>630</u>	<u>—</u>	<u>33</u>	<u>49</u>	<u>—</u>	<u>712</u>
TOTAL	1,991	70	60	191	6	2,318

During July, the preponderance of North Vietnam strike sorties went to Route Package I:^{3/}

<u>USAF</u>	<u>USN</u>	<u>USMC</u>	<u>TOTAL</u>
6,506 (99.9%)	500 (8.4%)	1,935 (100%)	8,938 (62.1%)

All of the Navy Route Package I attack sorties went to THOR (8.4 percent), while approximately 44 percent of the USAF and 64 percent of the Marine strike efforts were directed into the A0.

ARC LIGHT targets were nominated by both PCV and 7AF. (Fig. 2.) Although the Cap Mui Lay Coastal Sector received the bulk of the ARC LIGHT sorties, the entire A0 was struck. The following portrays the ARC LIGHT

SECRET

effort: ^{4/}

Targets Flown (By Nomination-Originator):

7AF - 21

PCV - 15

Sorties Flown (By Nominated Targets):

7AF - 120

PCV - 90

Total Ordnance (On Nominated Targets):

7AF - 3,510 tons HE

PCV - 2,360 tons HE

7AF Targets						PCV Tgts	
D	1995	D+1	1961	D+5	1989A	D+2	5195
D	1989	D+1	1962	D+5	1990A	D+2	5200
D	1990	D+1	1963			D+2	5201
D	1994	D+1	1982			D+2	5166
D	1993	D+1	2501			D+2	5199
D	1998	D+1	2503				
D	2505	D+1	1986			D+3	5214
D	1983	D+1	1991			D+3	5174
D	1979	D+1	1974			D+3	5208
D	1984					D+3	5213
						D+4	None
						D+5	5217
						D+5	5216
						D+5	5220
						D+6	5226
						D+6	5227
						D+6	5218

7AF Target Boxes Contained:

3 SAM Sites
69 AAA/AW Sites
62 Arty Sites
17 Storage Areas (mostly ammo)
9 Truck Parks

7 Truck Park/Storage Area
1 POL Dump
7 Bunker Complexes
10 Trench Networks

PCV target boxes contained artillery, AAA, Truck parks, Storage areas, Bunkers, Trenches, and Troops.

[REDACTED]

Results of Operation THOR

Provisional Corps V intelligence estimates of enemy strength in the Cap Mui Lay Sector prior to THOR credited the NVA with approximately 13 to 18 combat battalions supported by 14 artillery battalions. Firm verification was not possible, and the only unit positively identified in the area was the 138th NVA Independent Regiment. The psychological impact of the concentrated firepower was evident in the interrogation reports. In one case a NVA detainee stated his unit had been hit with B-52 strikes twice while infiltrating south, with many of the men killed or wounded.^{5/}

Observer reports indicated that most of the "villages" in the THOR area were actually fortified positions used for garrison and storage plus AA sites. Huts were dug in with only the roofs above ground, and linked with inter-connecting trenches. There was a noticeable lack of personnel sighted, and no pattern or specific activity could be established. Further, no farming was evident although stacked paddy rice was sighted in some areas. Counterfire delivered against AA and artillery positions located in and around these caused numerous secondary fires and explosions. In one specific instance, after air was directed against a troop assembly in one of these fortified "villages", 18^{6/} secondary explosions occurred lasting for approximately one and one-half hours. This was a dramatic indication that seemingly innocuous "villages" in NVN were being employed for military purposes.

The success of the operation hinged on timely acquisition of targets and the prompt attack of emerging targets. Targets were acquired through visual and photographic reconnaissance. Those acquired from photo readout were

[REDACTED]

passed to the Target Information Center (TIC), where they were compared with other holdings and either updated or assigned a target number. The targets were passed to the Fire Planning Section, where they were scheduled for either air, naval gunfire, or artillery. Targets acquired visually were passed directly by observers to the Fire Support Coordination Center, then to the TIC for comparison with previous holdings.^{7/}

7AF and 1st MAW flew 27 and 57 photo sorties, respectively, in the ten days from D-3 to D+6. Photo readout to PCV took 12 hours or less from the time the recon mission was flown. To take advantage of the latest readout, the last two hours of each scheduling day were reserved for those targets picked up by film. Targets of a temporary nature were passed to FSCC for immediate engagement and in some cases were struck less than eight hours after the recon mission was flown.^{8/}

BDA was obtained from aerial photograph readouts and visual observation by ground and aerial scanners. There were statistical differences between III MAF and 7AF regarding strike sorties/BDA. This was due, in part, to the difference in reporting THOR activity. Some fighter sorties were reported as having expended in THOR, when they had actually expended slightly outside.^{9/}
The rules that ABCCC used were:

"To count a THOR mission if they expended within the area outlined as THOR....Anything expended outside that area on a target labeled THOR was also counted as a THOR mission. Anything expending outside this area on a target not labeled THOR was not counted as a THOR mission even though it was a SAM, or something like that, obviously in support of the enemy...there were sorties that got into the area without our

[REDACTED]

anticipating them, these might have been counted by someone else and not by us or vice versa."

In late July, 7AF received a message from III MAF acknowledging discrepancies in BDA reporting. Subsequently, III MAF forwarded their photographs for 7AF examination to set the record straight and to resolve what the operation accomplished. The following is a cumulative summary of BDA attributable to 7AF and SAC forces throughout the seven-day period: ^{10/}

	<u>Secondary Exp/Fires</u>	<u>Arty Positions Dest/Dam</u>	<u>AAA Positions Dest/Dam</u>
7AF	40/131	2/0	23/6
SAC	<u>122/0</u>	<u>96/2</u>	<u>309/31</u>
TOTAL	162/131	98/2	332/37

THOR BDA and ammunition expenditure statistics (Appendix I) were not confirmed by photo reconnaissance, but were derived primarily from visual BDA attributable to bomber crew observations at 25,000 to 30,000 feet. Another source of visual BDA came from light plane observations, which were conducted, in most cases, at a distance because of simultaneous artillery fires or other tactical operations in progress. Moreover, no ground follow-up was conducted or contemplated and much of the ordnance was expended into triple canopy jungle (covering truck parks, storage areas, troop concentrations, etc.) making accurate BDA impossible. It should be noted that, although numerous unoccupied artillery and AAA positions were destroyed, confirmed photo BDA showed that only two artillery pieces were destroyed and only 11 AAA positions were occupied at the time of destruction. ^{11/}

SECRET

THOR as the AO was a denied area. Consequently, psyops were suited only to leaflets dropped from aircraft, and 28 million leaflets were produced and disseminated. Drop times were integrated into the scenario and were coordinated with the other supporting arms to produce maximum psychological impact upon the enemy. The leaflets were designed around a SLAM firepower theme and encouraged enemy forces to leave their positions and seek safer ones. The normal surrender appeals were not proposed, due to the environment being North Vietnamese soil with no friendly ground troops inside the impact areas.^{12/}

Friendly losses were extremely low. A total of 13 batteries of artillery with approximately 1,000 officers and men plus 59 artillery pieces were committed; however, there was only one artilleryman slightly wounded and one ammunition carrier damaged.^{13/} Despite the high number of air sorties involved, only two aircraft were downed, an A-1H and an F-105. The A-1H pilot was KIA after apparently staying with the aircraft, which burned upon bellying in; the F-105 crew member was rescued after lengthy SAR effort. (A third aircraft, Misty 31, an F-100F, lost all oil pressure after leaving the THOR area; both pilots ejected over the water and were subsequently rescued. The loss was not attributed to enemy defenses.)^{14/} The B-52s received no AAA reaction, but tactical pilots received 193 for a 22 percent reaction rate.^{15/} (Fig. 3.)

SECRET

OPERATION THOR STATISTICS 1-7 JUL 68

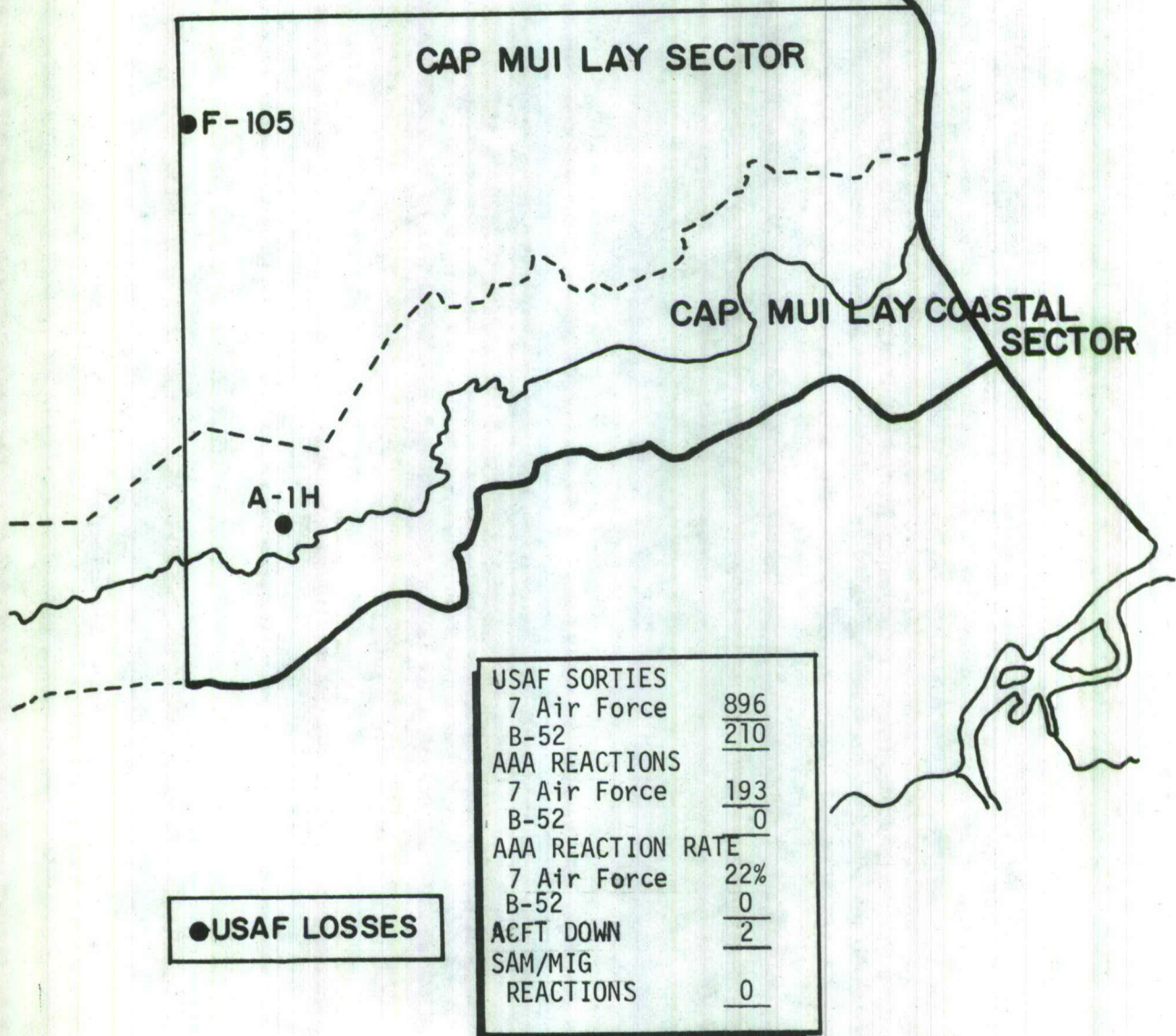


FIGURE 3

[REDACTED]

CHAPTER V
SUMMARY OF OPERATION

Operation THOR was an outstanding example of integration and application of firepower of the several services in a relatively small geographic locale. The SLAM operation had the objective of keeping the enemy off-balance and creating a permissive environment in an area denied access to for months. The Commanding General, Provisional Corps V, commented: "THOR has hurt the enemy badly."^{1/}

While Bomb Damage Assessment infers that severe damage was inflicted on the North Vietnamese Army, large numbers of actual gun kills were never confirmed by photography. Most BDA was obtained from crew reports and ground observers reporting silenced positions. The most impressive indications of damage, although received through indirect methods of assessment, were the minimal and ineffective hostile fire, and the continuing ability of observation aircraft to operate over the area. Reports since Operation THOR credited the NVA with cautious reoccupation but with a diminished strength.^{2/}

Lessons Learned

Among the lessons learned in Operation THOR are these:

PLANNING: A need exists for the formation of a modified standing joint planning group, rather than an ad hoc unit to devise standing operating procedures for joint Air/Artillery/Naval Gunfire operations. The obvious advantage to a semi-permanent group would be the accelerated planning time accrued when situations arise which require rapid joint service reaction. The planners would not be burdened with establishing doctrine as part of the planning cycle. Main issues, such as forces required and tactical application of these forces could then be expeditiously determined. ^{3/}

SECRET

COMMUNICATIONS: The total communications plan for THOR provided adequate support and permitted a timely exchange. A few exceptions were: (1) Communications were delayed in some instances due to inadequate equipment at various operating locations. The Air Surveillance Radar Team, for example, at Camp Carroll was located about ten miles west of Dong Ha, with the courier being the only means of cross-communication. By the time Dong Ha received the frag, they could not spare time to pass it to Camp Carroll; therefore, the Camp Carroll ASRT operated without it throughout the entire operation. 4/ On another occasion (D+2), 7AF was forced to frag AF-developed targets, which had been held in abeyance as the PCV targets did not arrive. 5/ (2) The volume of high precedence message traffic between 7AF and PCV was underestimated. Extensive use of FLASH priority contributed to the almost continuous backlog of messages at PCV communication centers. This backlog, in part, was enlarged when encoded target information was not accepted on voice circuits at 7AF, causing nomination messages to be sent over the already overloaded TTY circuits. This problem was partially resolved when target information was accepted through encoded voice. A dedicated TTY circuit between 7AF and PCV, planned and installed before Operation THOR, would have absorbed the message surge. In addition, a dedicated courier aircraft assigned to the controlling headquarters would insure timely distribution of target materials and other information not suitable for electrical transmission. 6/ (3) In an after action critique held at Udorn RTAFB, Thailand, PCV and ABCCC representatives stated that secure voice between ground stations and ABCCC would have made current targets more meaningful. The ABCCC had the KY-8 aboard, and the "Seek Silence" program was being implemented in 7AF aircraft to eventually provide secure voice capability for all Air Force planes and ground stations. It was generally agreed that a secure voice capability during THOR would have eased the target passing problem. 7/

TARGETING: Two target lists existed for the Cap Mui Lay Sector: the 7AF list was stored in a computer bank, while PCV's list was manually maintained, which made cross-reference a difficult and time-consuming task. A common system of target designation would avoid duplication in the attack of targets and be more responsive to changing situations. Underscoring possible duplication, an ABCCC representative stated that numerous times: "Flights were fragged

[REDACTED]

into a particular target which had already been completely obliterated a couple of days before. We'd send a FAC in there--a Misty (F-100F)--to look the thing over and he'd say, 'There's nothing there'." 8/

PCV believed lead time for ARC LIGHT nominations was excessive. The requirement to nominate ARC LIGHT targets three days before the requested strike time did not permit targets to be planned on the basis of the best intelligence available before TOT. A PCV representative stated: "You can't target very far ahead or you lose the value of the targeting." 9/ Clearance procedures should be streamlined to reduce lead time whenever possible. 10/

RADAR CONTROL:

Some THOR missions missed TOTs by excessive time periods, which resulted in an uneven flow of aircraft to TPQ and MSQ sites. To alleviate this problem, the ABCCC representative suggested lining up the targets by priority and, as the flights came in, put them against the next target rather than trying to match them against the frag. It was stated: "It's just immaterial which bomb is on which target. Just let them take off the stack...I think there would be considerably less confusion, fewer low fuel situations, and so forth...In fact with the total number of missions that were flown--any one of the MSQs could have handled every mission. There was no strain on any of them." The 7AF representative was of the opinion that the frags would match them, but after they were turned over to the control agency, it was up to their discretion. 11/

COORDINATION:

Although the fire support coordination techniques worked extremely well, time in transmitting maximum ordinates within the FCZs could have been reduced through a system of color codes. For example: Below 7,000 feet--red; between 7,000-14,000 feet--white; between 14,000-20,000 feet--blue. 12/

SECRET

FOOTNOTES

CHAPTER I

1. (S) Briefing Notes, Lt Col T. J. Stevens, USMC, PCV, TOC, THOR Critique, UDORN ABCCC, 13 Jul 68, Doc. 1. (Hereafter cited: Briefing Notes, Lt Col Stevens.)
2. Ibid.
3. (C) Interview by CHECO Personnel with Cdr Thomas H. Wood, USN, COMSEVENTHFLT, Det C, TSN, 19 Aug 68.
4. (S) Briefing Notes, Lt Col Stevens, Doc. 1.
5. (S) Briefing Notes, Col W. H. Embaly, USA, PCV ARTY, THOR Critique Notes, 13 Jul 68, Doc. 2. (Hereafter cited: Briefing Notes, Colonel Embaly.)
6. Ibid.
7. (S) Form 4, 7AF, subj: THOR Planning Conference, DPLP-68-0305, 29 Jun 68, Doc. 3. (Hereafter cited: THOR Planning Conference, DPLP-68-0305.)
8. (S) Memo, DOCR to DOA (CHECO), "Operation THOR", 13 Dec 68.

CHAPTER II

1. (S) Msg, CG, III MAF to Gen Abrams, 200028Z May 68.
2. (S) Msg, 7AF, TSNAB, RVN to COMUSMACV, Info CG, III MAF, subj: Attack on Enemy ARTY/Installation, Cap Mui Lay Sector (CMLS) (S), 200321Z Jun 68, Doc. 4. (Hereafter cited: Msg, 7AF, 20 Jun 68.)
3. Ibid.
4. Ibid.
5. Ibid.
6. (S) Form 4, Dep Director, Combat Operations, subj: Attack on Enemy Artillery/Installations Cap Mui Lay Sector (CMLS) (S), w/Tabs A, D, E, 17 Jun 68, Doc. 5. (Hereafter cited: Form 4, CMLS, 17 Jun 68.)
(S) Tab A, Msg, 7AF TSNAB, RVN to COMUSMACV (CACCOC2), subj: Attack on Enemy ARTY/Installation Cap Mui Lay Sector (CMLS) (S), 200001Z Jun 68;

UNCLASSIFIED

- (S) Tab D, Map, Cap Mui Lay Sector, undated.
- (C) Tab E, Directive, Hq USMACV, Nr 95-1, subj: Aviation, Procedures for Fire Support Coordination and Control in the TALLY HO Area (U), 21 Jan 68.
- 7. (S) Form 4, CMLS, 17 Jun 68, Doc. 5.
- 8. Ibid.
- 9. (S) Msg, CG, PCV to CG, III MAF, subj: Operation THOR Preliminary Planning Conf, 221010Z Jun 68. (Hereafter cited: Msg, CG, PCV, 22 Jun 68.)
- 10. Ibid.
- 11. (S) Msg, COMUSMACV to CG, III MAF; Cdr, 7AF, subj: Initiating Directive, Operation THOR (U), 251124Z Jun 68, Doc. 6. (Hereafter cited: Initiating Directive, Op THOR.)
- 12. (S) Ltr, DCS/Combat Operations to DO, subj: After Action Rpt Input-Operation THOR (U), with Tab A, 25 Jul 68, Doc. 7. (Hereafter cited: After Action Rpt Input, 25 Jul 68.);
- (S) Tab A, Msg, 7AF, TSAB, RVN to PCV, Phu Bai AB, RVN, subj: 7AF Draft Input to CO AAR (U), TACT-68-S-0835.
- 13. (S) THOR Planning Conference, DPLP-68-0305, Doc. 3.
- 14. Ibid.
- 15. Ibid.
- 16. Ibid.
- (S) Msg, 7AF, TSAB, RVN to PACAF, subj: Recon Effort in NVN and Laos (U), 250430Z Jun 68, Doc. 8.
- 17. (S) Rpt, DOA, Hq XXIV Corps to COMUSMACV, subj: Combat After Action Rpt (RCS: MACJ 3-37) (K-1) (U), 16 Aug 68, Doc. 9. (Hereafter cited: PCV After Action Rpt.)
- 18. (S) Msg, COMUSMACV to Comdr, 7AF; CG, III MAF, subj: Operation THOR (U), 300817Z Jun 68.

UNCLASSIFIED

UNCLASSIFIED

CHAPTER III

1. (S) PCV After Action Rpt, Doc. 9.
2. (S) Briefing Notes by CHECO Personnel at THOR Critique, Udorn RTAFB, Thailand, 13 Jul 68.
3. Ibid.
4. (S) PCV After Action Rpt, Doc. 9.
5. (S) Msg, CG, III MAF, DNG to COMUSMACV, subj: Extended Use of O-1 Aircraft (U), 020336Z Jul 68, Doc. 10.
6. (S) Msg, CG, PCV to 7AF, subj: "Request for FAC Support, 250319Z Jun 68;
(S) Msg, 7AF TSAB, RVN to CG, PCV, Phu Bai, subj: FAC Support, Operation THOR, 300305Z Jun 68, Doc. 11.
7. (S) PCV After Action Rpt, Doc. 9.
8. (S) Msg, CG, III MAF to COMUSMACV, subj: Preliminary Rpt - Operation THOR (U), 141538Z Jul 68, Doc. 12.
9. (S) PCV After Action Rpt, Doc. 9.

CHAPTER IV

1. (S) Msg, COMUSMACV to CINCPAC, subj: Tactical Air Support Operation THOR (U), 031024Z Jul 68, Doc. 13.
2. (S) Rpt, 7AF WAIS, 13 Jul 68, pg 10.
3. (TS) Rpt, Hq PACAF, Summary, Air Operations SEA, 23 Aug 68. (Extracted Portion is SECRET.)
4. (S) Records Research, TACP, ARC LIGHT, Jul 68.
5. (S) PCV, After Action Rpt, Doc. 9.
6. Ibid.
7. Ibid.
8. Ibid.

UNCLASSIFIED

UNCLASSIFIED

9. (S) Extract, Taped Record, THOR CRITIQUE, ABCCC at Udorn, 13 Jul 68, Doc. 14.
10. (S) After Action Rpt Input, 25 Jul 68, Doc. 7.
11. (S) Msg, Hq 7AF TSNAB, RVN to DASC Victor, Hue Phu Bai, subj: Operation THOR (U), 100230Z Jul 68, Doc. 15.
12. (S) PCV After Action Rpt, Doc. 9.
13. Ibid.
14. (C) Rpt to 7AF, Hillsboro and Alleycat ABCCC Rpts, 1-7 Jul 68, Doc. 16.
15. (SNF) Extract, Rpt, 7AF DI, WAIS, 68-29, 20 Jul 68, Doc. 17.

CHAPTER V

1. (C) Msg, 7AF, TSNAB, RVN to 3d Air Div, Andersen AB, Guam, subj: Congratulatory Msg on Op THOR (U), 210045Z Jul 68, Doc. 18.
2. (S) Msg, Hq 7AF TSNAB, RVN to DASC Victor, Hue Phu Bai, subj: Op THOR (U), 100230Z Jul 68, Doc. 15;
(CNF) Msg, COMUSMACV to AIG 7860, subj: ARC LIGHT Strike Results 30 Jun-6 Jul 68 (U), 141440Z Jul 68, Doc. 19;
(S) Msg, CG, PCV to CG, III MAF, subj: BDA Op THOR (U), 300332Z Jul 68, Doc. 20.
3. (S) THOR Planning Conference, DPLP-68-0305, Doc. 3.
4. (S) Extract, Taped Record, THOR CRITIQUE, ABCCC at Udorn, 13 Jul 68, Doc. 14.
5. (SNF) Msg, Hq 7AF, TSNAB, RVN to CG, PCV, Phu Bai, RVN, subj: PCV Targeting, Op THOR (U), Jul 68, Doc. 21.
6. (S) After Action Rpt Input, 25 Jul 68, Doc. 7.
7. (S) Extract, Taped Record, THOR CRITIQUE, ABCCC at Udorn, 13 Jul 68, Doc. 14.
8. Ibid.
9. Ibid.

UNCLASSIFIED

UNCLASSIFIED

10. (S) Msg, CG, III MAF to COMUSMACV, subj: Preliminary Rpt - Operation THOR (U), 141538Z Jul 68, Doc. 12.
11. (S) Extract, Taped Record, THOR CRITIQUE, ABCCC at Udorn, 13 Jul 68, Doc. 14.
12. (S) PCV After Action Rpt, Doc. 9.

UNCLASSIFIED

[REDACTED]

APPENDIX I

THOR AMMO EXPENDITURES, BOMB DAMAGE ASSESSMENT/GUN
DAMAGE ASSESSMENT

1. The following ammunition expenditures were reported for weapons systems:

a. Air Force:

(1) SAC B-52: 5,156 short tons.

(2) TAC Air: 3,207 short tons.

b. Artillery and Naval Gunfire:

<u>WEAPON AND CALIBER</u>	<u>TOTAL ROUNDS EXPENDED</u>
105-mm Howitzer	1,059
155-mm Howitzer	11,274
155-mm Gun	375
8" Howitzer	7,374
175-mm Gun	4,164
8"/55 Naval	4,483
5"/54 Naval Gun	8,160
5"/38 Naval Gun	6,130
6"/47 Naval Gun	249
TOTAL	<u>43,268</u>

2. Bomb Damage Assessment/Gun Damage Assessment.

<u>TARGET DESCRIPTIONS</u>	<u>DESTROYED</u>	<u>DAMAGED</u>	<u>TOTAL</u>
AA POSITIONS	789	39	828
AA WEAPONS	63	--	63
ARTY POSITIONS	179	24	203
ARTY WEAPONS	20	6	26

SECRET

<u>TARGET DESCRIPTIONS</u>	<u>DESTROYED</u>	<u>DAMAGED</u>	<u>TOTAL</u>
BUNKERS	143	70	213
CAVES	5	1	6
COASTAL DEFENSES	4	-	4
ENEMY KIA*	-	-	125
MORTAR/ROCKET SITES	5	1	6
REVETMENTS	18	4	22
ROADS CUT	24	-	24
SAM/LCHR/MSL/SITES	9	6	15
SAMPAN/BOATS	19	-	19
SECONDARY EXPLOSIONS	-	-	334
SECONDARY FIRES (14 POL)	-	-	290
STORAGE AREAS	8	-	8
STRONG POINTS	2	-	2
STRUCTURES	359	75	434
SUPPLY CACHE	1	-	1
TOWER (DIRECT HIT)	-	1	1
TRUCKS	3	-	3
TRUCK PARKS	3	-	3

3. Bomb Damage Assessment/Gun Damage Assessment, Post THOR (8 July-11 August 1968).

<u>TARGET DESCRIPTIONS</u>	<u>DESTROYED</u>	<u>DAMAGED</u>	<u>TOTAL</u>
AA/AW POSITIONS	19	12	31
AA/AW WEAPONS	4	0	4
ARTY POSITIONS	8	11	19

SECRET

[REDACTED]

<u>TARGET DESCRIPTIONS</u>	<u>DESTROYED</u>	<u>DAMAGED</u>	<u>TOTAL</u>
ARTY WEAPONS	24	45	69
BOATS/SAMPANS	12	1	13
BUNKERS/CAVES	581	96	677
CACHE/SUPPLY/AREAS	5	2	7
ENEMY KIA*	-	-	466
MORTAR/ROCKET SITES	4	-	4
ROCKETS	46	-	46
SAM/MSL/LCHR/SITES	-	4	4
SECONDARY EXPLOSIONS	-	-	376
SECONDARY FIRES	-	-	57
STRUCTURES	132	120	252
TRUCKS	4	11	15
TRUCK PARKS	-	1	1

* KIA reported by air observation; unconfirmed by ground body count procedures.


GLOSSARY

AAA/AW	Antiaircraft Artillery/Automatic Weapons
ABCCC	Airborne Command and Control Center
AO	Area of Operation
ARVN	Army of Republic of Vietnam
ASRT	Air Surveillance Radar Team
BDA	Bomb Damage Assessment
CMLS	Cap Mui Lay Sector
CMLCS	Cap Mui Lay Coastal Sector
COMUSMACV	Commander, U.S. Military Assistance Command, Vietnam
DASC	Direct Air Support Center
DMZ	Demilitarized Zone
ECM	Electronic Countermeasure
FAC	Forward Air Controller
FCZ	Fire Control Zone
FSCC	Fire Support Coordination Center
KIA	Killed in Action
LOC	Line of Communication
MACV	Military Assistance Command, Vietnam
MAF	Marine Amphibious Force
NGF	Naval Gunfire
NVA	North Vietnamese Army
PCV	Provisional Corps Vietnam
Psyops	Psychological Operations
RTAFB	Royal Thailand Air Force Base
RVN	Republic of Vietnam
SAM	Surface-to-Air Missile
TACAN	Tactical Air Navigation
TASS	Tactical Air Support Squadron
TFW	Tactical Fighter Wing
TIC	Target Information Center
TRW	Tactical Reconnaissance Wing
TTY	Teletypewriter
UTM	Universal Transmitter Mercator